Interaction of natural survival instincts and internalized social norms exploring the Titanic and Lusitania disasters

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Abstract: To understand human behavior, it is important to know under what conditions people deviate from selfish rationality. This study explores the interaction of natural survival instincts and internalized social norms using data on the sinking of the Titanic and the Lusitania. We show that time pressure appears to be crucial when explaining behavior under extreme conditions of life and death. Even though the two vessels and the composition of their passengers were quite similar, the behavior of the individuals on board was dramatically different. On the Lusitania, selfish behavior dominated (which corresponds to the classical homo economicus); on the Titanic, social norms and social status (class) dominated, which contradicts standard economics. This difference could be attributed to the fact that the Lusitania sank in 18 min, creating a situation in which the short-run flight impulse dominated behavior. On the slowly sinking Titanic (2 h, 40 min), there was time for socially determined behavioral patterns to reemerge. Maritime disasters are traditionally not analyzed in a comparative manner with advanced statistical (econometric) techniques using individual data of the passengers and crew. Knowing human behavior under extreme conditions provides insight into how widely human behavior can vary, depending on differing external conditions.

DOI: https://doi.org/10.1073/pnas.0911303107

Proceedings of the National Academy of Sciences 107(11) (2010): 4862-4865.

Interaction of natural survival instincts and internalized social norms exploring the Titanic and Lusitania disasters

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During the night of April 14, 1912, the RMS *Titanic* collided with an iceberg on her maiden voyage. Two hours and 40 minutes later she sank, resulting in the loss of 1,501 lives—more than two-thirds of her 2,207 passengers and crew. This remains one of the deadliest peacetime maritime disasters in history and by far the most famous. The disaster came as a great shock because the vessel was equipped with the most advanced technology at that time, had an experienced crew, and was thought to be practically "unsinkable" (although the belief that the ship had been widely believed to be truly unsinkable actually arose *after* the sinking, as explained in Howell, 1999). The *Titanic*'s fame was enhanced by the considerable number of films made about it: not including various made-for-television movies and series, the list would include *Saved from the Titanic* (1912), *In Nacht und Eis* (1912), *Atlantic* (1929), *Titanic* (1943 and 1953), *A Night to Remember* (1958), *Raise the Titanic!* (1980), and of course the 1997 *Titanic*, directed by James Cameron and starring Leonardo DiCaprio and Kate Winslet. In 1985, a joint American-French expedition, led by Jean-Louis Michel and Dr. Robert Ballard, located the wreckage and collected approximately 6,000 artifacts, which were later shown in a successful exhibition that toured the world.

For social scientists, evidence about how people behaved as the *Titanic* sunk offers a quasi-natural field experiment to explore behavior under extreme conditions of life and death. A common assumption is that in such situations, self-interested reactions will predominate and social cohesion is expected to disappear. For example, in an article called "The Human Being in Disasters: A Research Perspective," Fritz and Williams (1957, p. 42) write: "(Human beings)…panic, trampling each other and losing all concern for their fellow human beings. After panic has subsided – so the image indicates – they turn to looting and exploitation, while the community is rent with conflict..." Other researchers like Gray (1988) and Mawson (2007) present a

similar image, while movies, television and radio programs, novels, and journalistic reports of disasters often tend to reinforce this grim scenario. However, empirical evidence on the extent to people in the throes of a disaster react with self-regarding or with other-regarding behavior is scanty.

The sinking of the *Titanic* posed a life-or-death situation for its passengers.[1] Failure to secure a seat in a lifeboat virtually guaranteed death because the average ocean temperature was about 2 degrees Celsius (35 degrees Fahrenheit). Only a handful of swimmers were successfully rescued from the water (Subcommittee of the Committee on Commerce, 1912). Moreover, lifeboats were in short supply. The Titanic actually carried more lifeboats than required by the rules of the time, which were set by the British Board of Trade in 1894. However, those rules determined the number of lifeboats according to a ship's tonnage, rather than the number of persons aboard. As a result, the Titanic carried only 20 lifeboats, which could accommodate 1,178 people, or 52 percent of the people aboard. As the *Titanic* began to sink, deck officers exacerbated the shortage by launching lifeboats that were partially empty.

We have collected individual-level data on the passengers and crew on the *Titanic*, which allow us to analyze some specific questions: Did physical strength (being male and in prime age) or social status (being a first or second class passenger) raise the survival chance? Was it favorable for survival to travel alone or in company? Does the function (being a crew member or a passenger) affect the probability of survival? Do social norms, such as "Women and children first!" have any effect? Does nationality affect the survival chance? We also explore whether the time from impact to sinking might matter, by comparing the sinking of the *Titanic* over nearly three hours to the sinking of the *Lusitania* in 1915, which took only 18 minutes from when the torpedo hit the ship. The answers to these questions may help us to better understand human behavior in natural disasters such as hurricanes and tsunamis, as well as in man-made accidents and terrorist attacks.[2] Indeed, this kind of study can

[1] For detailed accounts of the disaster, see, for example, Lord (1955, 1986), Eaton and Haas (1994), Quinn (1999) and Ruffman (1999), as well as the *Encyclopedia Titanica* (http://www.encyclopedia–titanica.org) and the information provided by RMS Titanic, Inc. that was granted "salvor-in-possession" rights to the wreck by the U.S. District Court for the Eastern District of Virginia (http://www.titanic-online.com).

serve as a useful supplement to the findings of laboratory and field experiments (Levitt and List, 2009; List, 2008). Such studies have taught us much about how, for example, the extent to which individuals behave altruistically in helping each other in donating to charities, along with issues like the role of reciprocity and endogenous punishment (for example, Fehr et al., 2008; DellaVigna, 2009). But these studies seek to capture behavior under "normal" conditions, and it is not clear how or whether they would apply on a sinking ship in the North Atlantic Ocean.

Who Was On the Titanic?

We have constructed a detailed dataset of 2,207 persons who were confirmed to be aboard the R.M.S. *Titanic*. The data were gathered from the *Encyclopedia Titanica* and crosschecked with other sources.[3] Summary statistics of the variables collected are reported in Table 1. This table also reports in the last column for each category the fraction that survived. All of the means in the table are shares of the people on the Titanic who fell into each category—except for age, which is expressed in years.

Table 1

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[2] In the economic literature, behavior under extreme conditions is rarely treated. Exceptions are Hirshleifer's (1987) "behavior under adversity," as well as studies dealing with specific events occurring on markets (Barro, 2006). Natural disasters and terrorism have found some attention, especially after Hurricane Katrina (Tavares 2004; Shugart, 2006; Kenny, 2009). Post-disaster effects have been treated more often (Dacy and Kunreuther, 1969; de Alessi, 1967; Kunreuther, 1967; Kunreuther and Slovic, 1978; Skidmore and Toya, 2002).

[3] While there is some anecdotal conjecture that other people may have been aboard the Titanic as stowaways, all of the survivors were on the "official" passenger lists. The cross-checked resources include: Beavis (2002), Bryceson (1997), Committee on Commerce (1912), Eaton and Haas (1994), Geller (1998), Howell (1999), Lord (1955), Lord (1986), NSARM (2008), Quinn (1999), Ruffman (1999), U.S. National Archives (2008), Wreck Commissioner's Court (1912).

Out of 2,207 passengers and crewmembers, 1,501 people, or 68 percent, died. Based on the records, we were able to gather information about the gender, age, nationality, port where people boarded the *Titanic*, ticket price and therefore first, second, or third class passenger. In addition, we were able to generate individual information related to travel plans and companions. Limited information was available with regard to the cabin allocation: we were only able to find this information for 15.2 percent of passengers, and it is based on information provided by survivors, which means it is likely to include some bias. (In addition, because the Titanic hit the iceberg shortly before midnight, some of passengers were not yet in their cabins, but elsewhere on the ship). Of the 2,207 persons onboard, the age of all but 21 individuals (four crewmembers and 17 passengers) is known. Thus, using age in the regression reduces the number of observations to 2,186 persons. Out of the 2,186 people, 1,300 were passengers and 886 crewmembers. Among the passengers, 43 were servants. Additionally, of the 2,186 aboard, 1,704 were male (78 percent), and 460 of the 1,300 passengers were female (35 percent).

We use the United Nations standard for age, which classifies children as being 16 years of age or under. Thus, among the 2,186 people aboard, 124 were children (65 girls and 59 boys). Adulthood begins post childhood and ends at old age, defined by the British Royal Commission in 1894 as beginning at age 50. There were 280 women out of the 2,186 people aboard between 16 and 35 years of age. Whether a passenger has been in the company of friends and family or traveled alone has been identified by anecdotal evidence taken from family histories and known travel arrangements, ticket numbers, and cabin allocations; those passengers for whom there is no clear or known evidence were assumed to be traveling alone and assigned as single. We have complete information on each person's country of residence (nationality). From this, we have been able to generate several variables to investigate the effects of nationality. The largest national group (53 percent) was from England, followed by the United States (19 percent).

Who Survived?

Before undertaking this study, we would have predicted that certain groups would be more likely to survive the sinking of the Titanic: prime-age men, first-class passengers, those travelling in company, crew members, women with children, and British subjects. But only some of these hypotheses turned out to be correct. The descriptive statistics in Table 1 indicate high survival rates for female, first and second class passengers, children, and a low survival rate for individuals travelling alone and with English and Swedish nationality. However, this purely descriptive analysis gives information about the raw effects and not the partial effects. Thus, multiple regressions help us to better disentangle the single effects. Table 2 presents estimates from probit regressions[4], in which the dependent variable in our analysis will be whether someone survived (= 1) or not (= 0). The first figure shows the estimated coefficients, the second statistical significance (z-values), and the third figure the marginal effects. The estimates include an increasing number of determinants to show the extent to which the estimated coefficients are stable across different estimates. Since the coefficients are difficult to interpret directly in a probit model, the marginal effect of a continuous explanatory variable x_j will, as usual, be interpreted through the partial derivative

$$\frac{\partial \Pr(y = 1 \mid x_1, x_2, ..., x_k)}{\partial x_j} = \beta_j \phi(\alpha + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_k x_k), \qquad (1)$$

evaluated at the means, where ϕ is the standard normal density function. Since $\phi > 0$, the sign of the marginal effect is the same as the sign of coefficients β_j. For a discrete x_j, a difference rather than a derivative is used in place of (1) (change of the dummy variable from 0 to 1). To get, e.g., the marginal effect for age in the first equation in

[4] $\Pr(y = 1 \mid x_1, x_2, \ldots, x_k) = \Phi(\alpha + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_k x_k)$. Here y is a dummy variable indicating whether the passenger survived ($y = 1$) or not ($y = 0$); the variables $(x_1, x_2, \ldots, x_k)$ are explanatory variables such as gender, age, etc; $(\alpha, \beta_1, \beta_2, \ldots \beta_k)$ are parameters to estimate; and Φ is the cumulative standard normal distribution function. The role of Φ, which is increasing in its argument, is to keep the probability $\Pr(y = 1)$ in the zero to one interval. A linear probability model would generate fitted probabilities that can be less than zero or greater than one. Each passenger contributes one observation on $(y, x_1, x_2, \ldots, x_k)$. From a sample of such observations, assumed independent, the parameters can be estimated by maximum likelihood. This is a standard probit model.

Table 2 we multiply the coefficient -0.018 with the standard normal density function[5] which leads to a marginal effect of -0.018*0.370= -0.0067. Thus, the marginal effect implies that a marginal change in age from the average of 30 years is associated with a 0.7% decrease in survival.

Table 2

Table 2 shows that we are working with a large set of dummies variables. For example, in the equation in column 1 we report results of two dummy variables that describe the social status (ticket class) of the passengers: first class and second class. Each of these is coded 1 or 0 depending on whether or not the person is in that particular status or not. There are actually three categories of ticket status that are mutually exclusive and exhaustive: first class, second class, and third class. The excluded category (third class) is the reference group because each of the coefficients is a comparison between an included category and the reference category. To increase readability we report all the reference groups in Table 2 and 4.

Prime-age Men

In the situation of a large excess demand for places in the lifeboats, people with greater physical strength, namely people in their prime age and men, would have a physical strength advantage over older people and women in the fight for survival.

The equations in columns 1 to 3 of Table 2 suggest that women both as passengers and crew members had a higher probability of survival. Women passengers had, compared to men, with age and traveling class held constant, a 53 percent higher chance of survival; it was even 64 percent higher for female crew members. The fourth column reveals that persons in prime age (16 to 50) had a 16 percent higher chance to survive than older persons, which is consistent with the thesis that physical strength was important in getting to the lifeboats.

[5] In this case we first calculate the z-score for the stated probability of surviving (Pr(success) = 0.348) which is -0.391. Next we calculate the pdf (probability density function) value for that z-score which gives us the value of 0.370.

Social Status and Ticket Class

The 1,316 passengers (including maids) on the *Titanic* were traveling as mentioned before in three different classes: 325 in first class, 285 in second class, and 706 in third class. It seems plausible that first-class passengers would be more able to secure a place on a lifeboat than people of lesser economic means. First-class passengers were used to giving orders to the crew, and they were better able to bargain— even offering financial rewards. They were also in closer contact with the upper echelon crewmembers: in particular, First Officer Murdoch, who commanded the loading of lifeboats on the starboard side, and Second Officer Lightoller, who did the same on the port side. Moreover, the first-class passengers had better access to information about the danger and the lifeboats were located close to the first-class cabins. In contrast, most third-class passengers had little idea where the lifeboats were located (safety drills for passengers were introduced only after the *Titanic* disaster), and they did not know how to reach the upper decks where the lifeboats were stowed.

Thus, it seems plausible that first-class passengers would have a higher probability of survival than second-class passengers; in turn, second-class passenger would have a higher probability of survival than third-class passengers. Results in the first and second column of Table 2 indicate that first- and second-class passengers had a significantly better chance to survive than passengers in third class. Passengers traveling first class had a more than 40 percent, and passengers in second class about a 16 percent, higher chance to be saved than those in third class.

Social Embeddedness

Passengers traveling in the company of family and friends may be expected to have a better chance of survival in life and death situations because they are more likely to receive information indirectly and to obtain psychological and physical support from others. However, equations in columns 4, 5 and 6 in Table 2 suggest that it did not matter for survival whether one traveled alone or in the company of family and friends. It may be that those who were alone were able to focus more specifically on their own best interests, rather than being slowed by a group, and that this counterbalanced any benefit of travelling with a group.

Function

One would expect the experienced crew of 886 men and women to be better prepared for a catastrophic event, to be informed earlier and better about the location of lifeboats and the danger of sinking, and to have closer personal contacts with the crewmembers in charge of loading the lifeboats. On the other hand, the crew has a duty to help save passengers, and they are only supposed to abandon a sinking ship when that task has been fulfilled.

We expect that in life or death situations, such as that encountered on the *Titanic*, selfish interests tend to dominate. Indeed, the equation in column 5 of Table 2 suggests that the members of the crew had ceteris paribus a 24 percent higher chance of saving themselves than did third class passengers.

Social Norms

A key social norm under life and death conditions is that women and children are to be saved first. This norm may operate either through the actions of male passengers, or though the officers loading the lifeboats. Interestingly, no international maritime law requires that women and children be rescued first. However, similar norms can be found in other areas where people need to be evacuated. Humanitarian agencies often evacuate "vulnerable" and "innocent" civilians, such as women, children, and elderly people first. The Geneva Convention provides special protection and evacuation priority for pregnant women and mothers of young children (Carpenter, 2003).

The results in column 6 of Table 2 suggest that this norm was indeed in force. Women in the company of children had a 65 percent higher survival chance than men, while female without children had a 51 percent higher survival chance. Focusing only on female passengers in a further specification not reported in Table 2 also indicates that women with children had a 19 percent higher chance of surviving than women without children.

Nationality

The *Titanic* was built in Great Britain, operated by British subjects, and manned by a British crew. Interestingly enough, the Ocean Steam Navigation Company, popularly known as the "White Star" line because of the white star appearing on the company flag, was under the management of the industrial giant, J.P. Morgan. Nevertheless, the public perceived the *Titanic* as being a British ship. Thus, it might be expected that the crew would give preference to British subjects, easily identified by their language.

However, columns 4 and 5 of Table 2 reveal a quite different picture. Controlling for all other influences considered above, British passengers had a between 8 and 9 percent lower chance of surviving the *Titanic* disaster than the passengers of other nationalities aboard. This may be attributed to the fact that the British behaved with a "stiff upper lip", or perhaps British subjects were less likely to believe that the Titanic would sink.

The Influence of Time as a Disaster Unfolds

It took 2 hours and 40 minutes between the time the Titanic hit the iceberg and the moment the ship sank to the bottom of the sea. It can be argued that this left sufficient time for socially determined patterns of behavior, such as letting first the passengers of the better classes, or women and children, to be saved. We therefore compare the survival probabilities on the *Titanic* with those of another well-known shipping disaster, the sinking of the *Lusitania* only three years later, on May 7, 1915 as a result of a torpedo attack by a German U-boat, costing the lives of 1,313 people. It can be argued that on the *Lusitania*, selfish behavior prevailed, while on the *Titanic* the adherence to social norms and social status dominated. This difference could be attributed to the fact that the *Lusitania* sank in only 18 minutes, creating a situation in which the short-run flight impulse dominates behavior.

In addition, the *Lusitania* was sunk by violence during a time of war, which may provoke different reactions. For example, before the sailing of the *Lusitania,* warning notices had been printed in the leading newspapers reminding transatlantic passengers that a state of war was in effect and that any vessel travelling under the

British flag was liable to come under attack, and passengers sailed at their own risk. On the other hand, there are several reasonable suppositions supporting the idea that the *Lusitania* was not at severe risk, primarily that it was capable of speeds fast enough to outrun enemy torpedoes. In addition, the *Lusitania* was a vessel carrying civilian passenger, not a warship. Finally, it was carrying a considerable number of neutral American civilians. Maritime law states that in wartime merchant vessels must be given a warning prior to attack, whereas warships should not expect any warning. The *Lusitania* was never given such a warning by the attacking U-boat (Bailey, 1935).

We were able to collect data containing detailed information about gender, age, ticket price and thus the passenger-class status for the *Lusitania*. Table 3 shows that the passenger structure with respect to the share of women, age and first class passengers on the *Titanic* and the *Lusitania* was quite similar. In both disasters, 32 percent of the persons aboard survived. On the other hand, the survival rate with respect to gender and ticket class is substantially different. In the Lusitania, the survival rates of women, first class, and second class passengers are now lower than the average survival rate.

Table 3

We again carried out a probit regression analysis in which the dependent variable indicates whether an individual survived the disaster (=1) or did not survive (= 0). Table 4 shows the estimated parameters, the significance level (indicated by z-values) and the marginal effects for the *Lusitania*. These estimates reveal a smaller number of statistically significant determinants, suggesting that in the case of the sinking of the *Lusitania* random elements played a larger role than in the case of the *Titanic*.

The results in Table 4 indeed indicate that people in their prime age (16-50) had a statistically significantly higher survival rate than older people. Prime-age males had a 17 percent higher survival probability than other persons aboard. Women in their prime age had a 20 percent higher survival chance, but not women in general. A comparison with the *Titanic* disaster suggests that when a disaster is perceived to be immanent, individuals in their prime age have an advantage, but not men as such (the

coefficient for female is not statistically significant). Unlike the situation on the Titanic, first and second class passengers did not have a significantly higher survival chance on the *Lusitania*; as shown in Table 4, first-class passengers fared even worse than those in third class.

Table 4

The empirical analysis is consistent with the view that the effects of status (passengers traveling in higher classes have a better chance of surviving) and social norms (such as saving women and children first) depend on time. It seems that on the more slowly sinking *Titanic* pro-social behavior played a larger role, while a more selfish conduct prevailed on the rapidly sinking *Lusitania*. Of course, time may not be the only factor at work. Natural experiments based naval disasters may well have other factors that should be controlled for.

Conclusions

The econometric estimates of the factors determining survival during the sinking of the *Titanic* produce a coherent story. However, this story is not necessarily in line with the simple model of selfish *homo economicus.* While people in their prime were more likely to be saved, it was women—rather than men—who had a better chance of being saved. Children also had a higher chance of surviving. At the time of the disaster, the unwritten social norm of "saving women and children first" seems to have been enforced.

However, we do find evidence suggesting that effects predicted using the standard *homo economicus* model are also important. People in their prime age drowned less often than older people. Passengers with high financial means, traveling in first class, were better able to save themselves as were passengers in second class (compared to third class). Crew members who had access to better informational and relational resources managed to survive more often than others aboard. In contrast, the British passengers who were the same nationality as most of the crew members did

not use this fact to their advantage. Differences in context are likely to matter in life and death situations. The comparison between the *Titanic* and the *Lusitania* suggests that when time is scarce, individual self-interested flight behavior predominates, while altruism and social norms and power through social status become more important if there is sufficient time for them to evolve.

The sinking of the *Titanic* represents a well-documented, dramatic, life-or-death situation. However, even under these extreme situations, the behavior of human beings is not random or inexplicable, but can be explored and at least in part be explained by economic analysis.

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Table 1. Summary Statistics for the *Titanic*

Variables	**Mean**	**Fraction Survived**
Survived	0.320	
Females	0.220	0.724
Males	0.780	0.206
Females without Children	0.203	0.705
Females with Children	0.017	0.947
Age	30.044	
Age < 16 (Children)	0.052	0.478
Age 16-50	0.891	0.309
1st Class Passengers	0.147	0.617
2nd Class Passengers	0.129	0.404
3rd Class Passengers	0.321	0.253
Crew	0.403	0.238
Traveling Alone	0.217	0.240
Traveling with a Group	0.783	0.342
England	0.527	0.253
Ireland	0.052	0.342
Sweden	0.048	0.255
USA	0.192	0.491
Other Nationalities	0.181	0.346

Notes: The number of observations is 2,207, except for age where it is 2,186. Traveling with a Group: couples with and without children and/or servants, singles with children and/or servants, extended group also covering friends. Sources: The *Encyclopedia Titanica* (2008) has been used as the primary source, which was crosschecked across the following resources: Beavis (2002), Bryceson (1997), Committee on Commerce (1912), Eaton and Haas (1994), Geller (1998), Howell (1999), Lord (1955), Lord (1986), NSARM (2008), Quinn (1999), Ruffman (1999), U.S. National Archives (2008), Wreck Commissioner's Court (1912).

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Table 2 Determinants of the Probability of Survival on the *Titanic*

	Passenger	Passenger	Crew	Passenger	All	Passengers
	(1)	(2)	(3)	(4)	(5)	(6)
Female	1.462***	1.468***	1.858***	1.456***	1.471***	
z-value	17.26	17.44	5.50	16.77	17.52	
marg. effect	0.528	0.530	0.640	0.526	0.535	
Male	ref. group	ref. group	ref. group	ref. group	ref. group	ref. group
Female with children						2.368***
z-value						6.25
marg. effect						0.647
Female no children						1.401***
z-value						15.87
marg. effect						0.512
Age	-0.018***					
z-value	-5.24					
marg. effect	-0.007					
Age < 16 (Children)		0.382**		0.807***	0.743***	0.835***
z-value		2.83		3.93	3.74	4.00
marg. effect		0.148		0.313	0.077	0.323
Age 16–50		ref. group		0.470**	0.418***	0.492***
z-value				2.99	2.85	3.07
marg. effect				0.161	0.041	0.168
Age > 50		ref. group		ref. group	ref. group	ref. group
1st Class Passengers	1.303***	1.066***		1.140***	1.117***	1.111***
z-value	11.34	10.62		10.75	10.55	10.39
marg. effect	0.485	0.403		0.429	0.420	0.420
2nd Class Passengers	0.462***	0.387***		0.407***	0.482***	0.488***
z-value	4.37	3.74		3.90	4.41	4.37
marg. effect	0.177	0.148		0.155	0.18	0.187
3rd Class Passengers	ref. group	ref. group		ref. group	ref. group	ref. group
Traveling Alone				-0.057	-0.064	-0.051
z-value				-0.62	-0.70	-0.55
marg. effect				-0.021	-0.022	-0.019
Traveling with a Group				ref. group	ref. group	ref. group
England					-0.226**	-0.256**
z-value					-2.48	-2.45
marg. effect					-0.079	-0.092
Not from England					ref. group	ref. group
Crew					0.671***	
z-value					5.80	
marg. effect					0.237	
Obs.	1300	1300	886	1300	2186	1300
Prob.>chi2	0.000	0.000	0.000	0.000	0.000	0.000
Pseudo R2	0.292	0.280	0.041	0.286	0.211	0.295

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Notes: Dependent variable: Survival (value = 1). The symbols *, **, *** represent statistical significance at the 5, 1, and 0.1% levels, respectively. In the reference group (ref. group): Male, Age>50, 3rd Class Passenger, Traveling with a Group (couples with and without children and/or servants, singles with children and/or servants, extended group also covering friends), NOT FROM ENGLAND.

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Table 3. Passenger Structure on the *Lusitania* and the *Titanic*

	Lusitania		**Titanic**	
Variables	**Mean**	**Fraction Survived**	**Mean**	**Fraction Survived**
Survived	0.326		0.320	
Females	0.261	0.280	0.220	0.720
Males	0.739	0.343	0.780	0.206
Age (years)	31.570		30.040	
1st Class Passengers	0.149	0.193	0.147	0.617
2nd Class Passengers	0.307	0.295	0.129	0.404
3rd Class Passengers	0.189	0.325	0.321	0.253

Source: The Lusitania Resource (2009) has been used as the primary source, which was crosschecked across Butler (2000), Lusitania Online (2009), O'Sullivan (2000), Preston (2002), Wreck Commissioner's Court (1915).

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Table 4.
Determinants of the Survival on the *Lusitania*

Probit	
	(7)
Female	-0.064
z-value	-0.33
marg. effect	-0.022
Male	reference group
Age<16 (Children	0.312
z-value	1.5
marg. effect	0.111
Age>50	reference group
Female Age 16-50	0.556**
z-value	2.59
marg. effect	0.199
Male Age 16–50	0.493**
z-value	2.42
marg. effect	0.166
1st Class Passengers	-0.384***
z-value	-3.33
marg. effect	-0.123
2nd Class Passengers	0.033
z-value	0.31
marg. effect	0.011
3rd Class Passengers	reference group
Obs.	933
Prob.>chi2	0
Pseudo R2	0.025

Notes: The symbols *, **, *** represent statistical significance at the 10, 5, and 1% levels, respectively. Reference groups: Male, Age>50, 3rd Class Passengers.